

US EPA RECORDS CENTER REGION 5



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INTERIM GROUNDWATER MONITORING PROGRAM REPORT

**HIMCO SITE
ELKHART, INDIANA**

**Prepared For:
Himco Site Trust**

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5.4.1 PRIMARY MCLs

Five different metals were detected at concentrations greater than their Primary MCLs during the Interim Groundwater Monitoring Program. They were arsenic, beryllium, chromium, lead, and thallium. The duplicate groundwater samples collected from WT115A in November 2008 contained all exceedances of beryllium and thallium, two of four lead exceedances, two of four chromium exceedances, and two of seven arsenic exceedances. Upper Aquifer monitoring well WT115A is located in the southeast corner of the Site on the perimeter of the waste and approximately 200 feet north of the southern Site boundary. Table 5.6 provides analytical results for metals analysis of groundwater samples collected from Upper Aquifer monitoring well WT115A.

The turbidity of the initial sample collected from WT115A in November 2008 was elevated. Subsequent turbidity results are as follows:

<i>Sample Date</i>	<i>Sample Turbidity (NTU)</i>	<i>Primary MCLs Exceeded</i>
11/6/2008	190	arsenic, berelium, chromium, lead, thallium ⁽²⁾
2/12/2009	60.3	lead
5/6/2009	72.9	--
8/5/2009	79.9	--
11/6/2009	4.73	--
3/2/2010	49.4	--
6/17/2010	171	lead
9/15/2010	206	--
(2) field duplicate sample		

CRA re-developed the well prior to the November 2009 sampling event. This removed silt from the well screen and sand pack, and reduced the turbidity of the subsequent groundwater samples. Elevated sample turbidity limits the reliability of the metals results from the initial sampling round. Re-development of the well has reduced sample turbidity and the groundwater samples collected subsequently did not contain arsenic, beryllium, chromium, or thallium at concentrations that exceeded their Primary MCLs.

As shown in Table 5.3, the BV values for chromium and thallium are greater than the Primary MCLs and are therefore the appropriate GW RAO. Chromium and thallium concentrations in groundwater samples collected during the Interim Groundwater Monitoring Program were less than the BV and therefore the GW RAO. Chromium exceeded the Primary MCL in two groundwater samples collected from background monitoring well WT102A during rounds Q5 and Q6 of the Interim Groundwater

Monitoring Program. The exceedances are not Site related because they occur in the background well located north (upgradient) of the Site.

CRA does not believe that these rare exceedances of the Primary MCLs for arsenic, beryllium, chromium, and thallium warrant continued routine groundwater quality monitoring.

As shown in Table 5.6, lead concentrations were greater than the Primary MCL in two other samples collected from WT115A and account for the other two of the four lead exceedances during the Interim Groundwater Monitoring Program. Therefore the only exceedances of the Primary MCL for lead during the Interim Groundwater Monitoring Program were restricted to groundwater samples collected from monitoring well WT115A. Section 6.0 includes CRA's recommendations with respect to future routine groundwater monitoring for metals in the vicinity of the Site.

The duplicate groundwater samples collected from WT115A in November 2008 accounts for two of seven arsenic exceedances that occurred during the Interim Groundwater Monitoring program. The other arsenic exceedances occurred in the groundwater sample collected from the following wells:

<i>Well</i>	<i>Sample Date</i>	<i>Arsenic Concentration (µg/L)</i>	<i>Detection Frequency</i>
WT106A	2/26/2010	38.6	12%
WT106B	6/17/2010	12.2	100%
WT106B	9/9/2010	11.6	100%
WT114C	9/9/2010	20.4	50%
WT120B	6/21/2010	19.7	50%

WT106A and WT106B are located approximately 400 feet south of the southeast corner of the Site. CRA recommends continued groundwater quality monitoring for arsenic to determine if the arsenic concentration in groundwater samples collected from the monitoring well cited above persistently exceed the Primary MCL.

5.4.2 IRON

Tables 5.3, 5.4, and 5.5 provide a comparison of iron results from the Interim Groundwater Monitoring Program to the GW RAOs. The GW RAO for iron was exceeded in 11 of 247 samples, or 4.5 percent, collected during the Interim Groundwater Monitoring Program. All the exceedances occurred in samples collected from Upper

Aquifer monitoring wells WT101A, WT115A, and in one groundwater sample from WT116A, located in the southeast corner of the Site.

Figures 5.1, 5.2, and 5.3 show iron results for groundwater samples collected from the Upper, Intermediate and Lower Aquifers, respectively, during the Interim Groundwater Monitoring Program Q8 round completed in September 2010 and are typical of previous monitoring data. The concentration of iron in groundwater samples collected from Upper Aquifer monitoring well WT101A routinely exceeds the GW RAO. It is also exceeded in three groundwater samples collected from Upper Aquifer monitoring well WT115A, and in one groundwater sample from WT116A, both located along the southern edge of the Site. Iron concentrations in groundwater samples collected from the Intermediate and Lower Aquifer monitoring wells during the Interim Groundwater Monitoring Program were not greater than the GW RAO.

CRA recommends that routine groundwater monitoring for iron in the Upper and Intermediate Aquifers continue in the vicinity of the Site because of routine exceedances of the GW RAOs for iron in groundwater beneath the southeast corner of the Site. Section 6.0 provides the details of the proposed Groundwater Monitoring Program. CRA does not recommend groundwater quality monitoring for iron in the Lower Aquifer because iron concentrations are less than the GW RAO.

5.4.3 CALCIUM

Tables 5.3, 5.4, and 5.5 provide a comparison of calcium results from the Interim Groundwater Monitoring Program to the GW RAOs. The GW RAOs for calcium were exceeded as follows:

	<i>GW RAO (mg/L)</i>	<i>No. of Exceedances/No. of Samples (percent)</i>
Upper Aquifer	275	19/110 (17.3%)
Intermediate Aquifer	250	0/97 (0%)
Lower Aquifer	250	0/40 (0%)

Figures 4.17, 4.18, and 4.19 provide calcium results for groundwater samples collected from the Upper, Intermediate and Lower Aquifers, respectively, during the Interim Groundwater Monitoring Program Q8 round completed in September 2010. The Interim Groundwater Monitoring Program Q8 round calcium results are typical of previous monitoring data. The concentrations of calcium in groundwater samples collected from

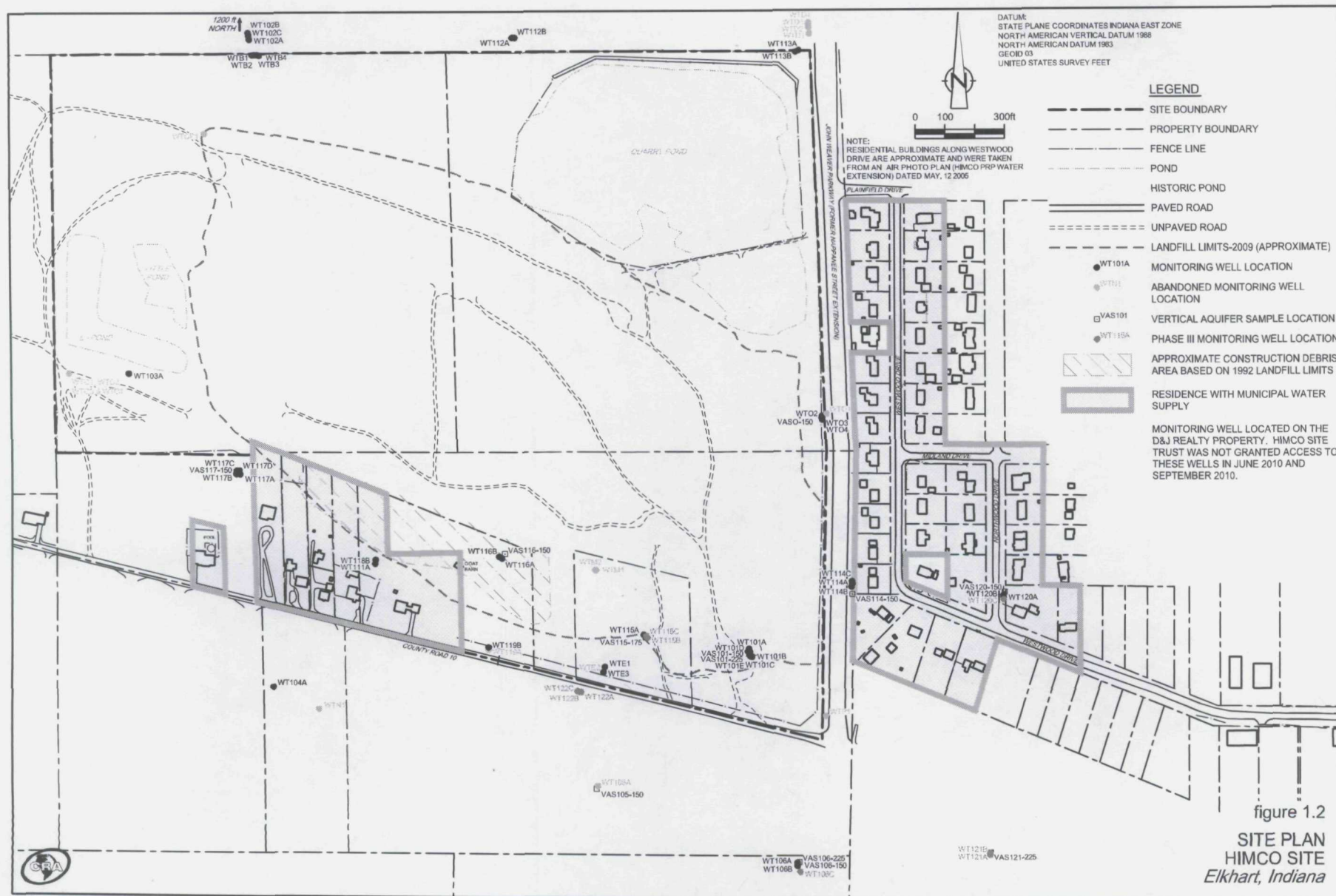
Upper Aquifer monitoring wells WT116A and WT101A routinely exceed the GW RAO. These wells are located along the southern edge of the Site. The Upper Aquifer GW RAO is also exceeded occasionally in groundwater samples collected from Upper Aquifer monitoring well WT115A, also located along the southern edge of the Site. Calcium concentrations in groundwater samples collected from the Intermediate and Lower Aquifer monitoring wells during the Interim Groundwater Monitoring Program were not greater than the GW RAO.

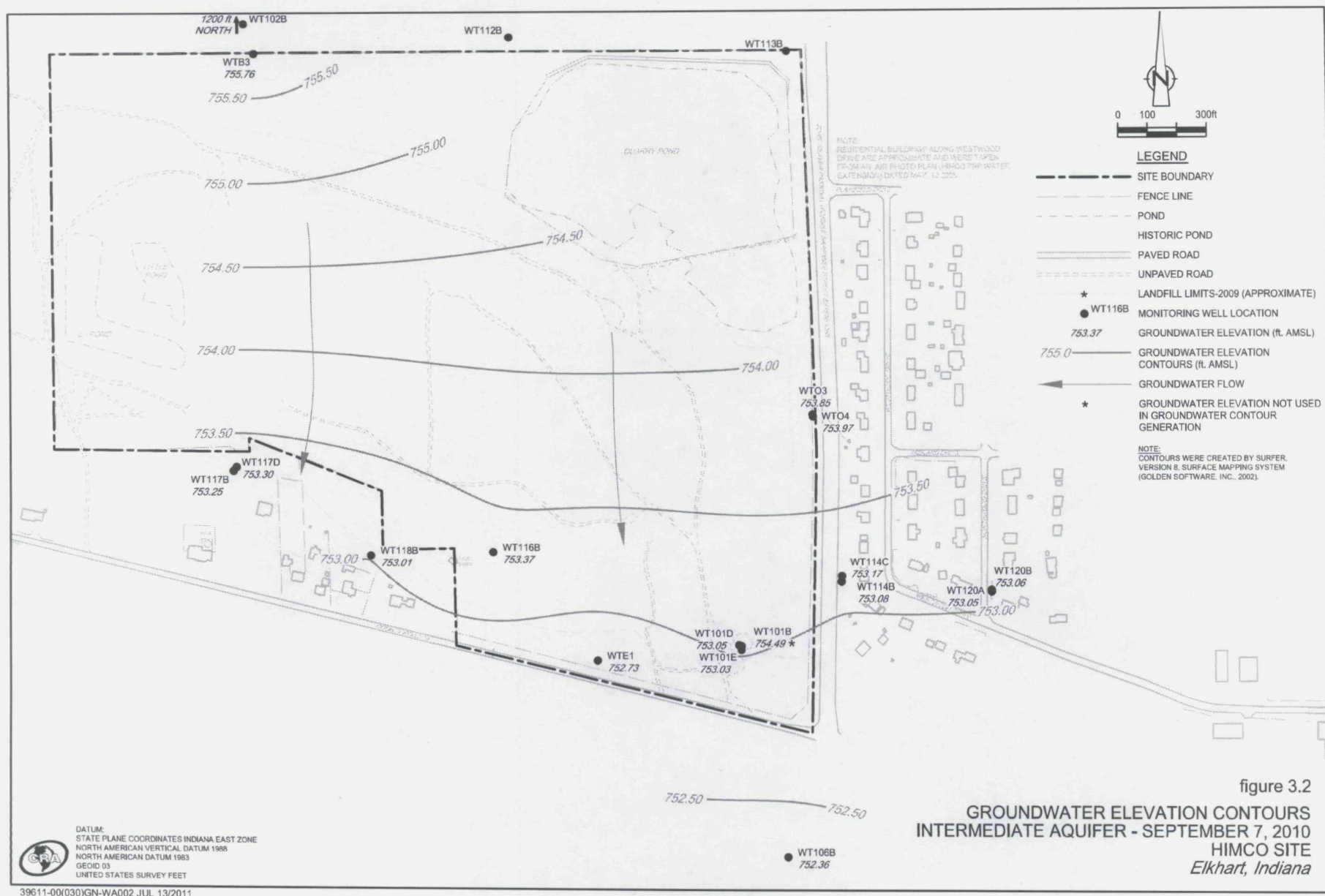
CRA recommends that routine groundwater quality monitoring in the Upper and Intermediate Aquifers continue in the vicinity of the Site because of routine exceedances of the GW RAOs for calcium in groundwater beneath the Site. CRA does not recommend groundwater quality monitoring for calcium in the Lower Aquifer because calcium concentrations are less than the GW RAO. Section 6.0 provides the details of the proposed Groundwater Monitoring Program.

5.4.4 SODIUM

Tables 5.3, 5.4, and 5.5 provide a comparison of sodium results from the Interim Groundwater Monitoring Program to the GW RAOs. Figures 4.20, 4.21, and 4.22 provide sodium results for groundwater samples collected from the Upper, Intermediate and Lower Aquifers, respectively, during the Interim Groundwater Monitoring Program Q8 round completed in September 2010. The GW RAO was exceeded in samples from only two monitoring wells, both in the Upper Aquifer. The GW RAO for sodium was routinely exceed in groundwater samples collected from Upper Aquifer monitoring well WT116A during the Interim Groundwater Monitoring Program. WT116A is located along the southern Site boundary. The concentration of sodium also occasionally exceeded the GW RAO in the groundwater sample collected from WT114A, located east of the Site. As discussed in Section 4.4.5, the source of the sodium in the Upper Aquifer in the vicinity of monitoring well WT114A is likely road salt applied to the adjacent roadway. This is consistent with the fact the highest concentration of chloride measured during the Interim Groundwater Monitoring Program occurred in groundwater samples collected from WT114A.

CRA recommends that routine groundwater quality monitoring for sodium continue in the Upper and Intermediate Aquifers the vicinity of the Site because of routine exceedances of the GW RAOs for sodium in groundwater samples collected from WT116A. Section 6.0 provides details of the proposed Groundwater Monitoring Program.





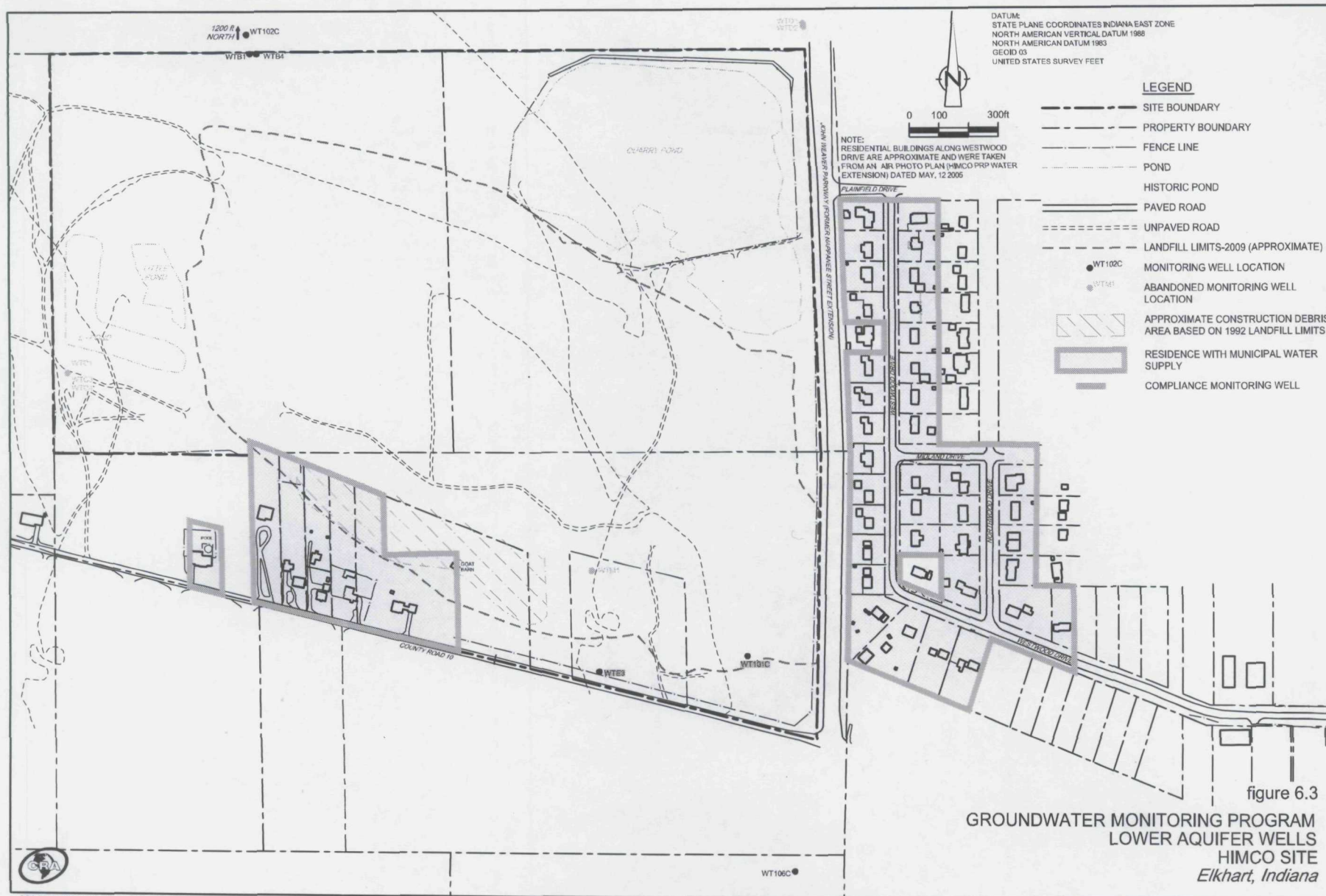


TABLE 5.3

UPPER AQUIFER SUMMARY OF DETECTED METALS AND GENERAL CHEMISTRY PARAMETERS
INTERIM GROUNDWATER MONITORING PROGRAM
HIMCO SITE
ELKHART, INDIANA

Parameters	Units	Primary MCL	Secondary MCL	RDA	BV	GWRAO	Number of Exceedences (compared to GWRAO)	Percentage of Exceedences (compared to GWRAO)	Number of Samples	Number of Detections	Percentage of Detections	Maximum Detection	Minimum Detection
Metals													
Aluminum	µg/L	-	50	-	860	860	23	20.91%	110	76	69.09%	630000	19.1
Antimony	µg/L	6	-	-	42.2 UJ	42.2 UJ	0	0.00%	110	37	33.64%	1.2	0.13
Arsenic	µg/L	10	-	-	6.9 U	10	3	2.73%	110	91	82.73%	38.6	0.4
Barium	µg/L	2000	-	-	75	2000	0	0.00%	110	107	97.27%	1400	4
Beryllium	µg/L	4	-	-	3.1 BJ	4	2	1.82%	110	20	18.18%	12.9	0.46
Cadmium	µg/L	5	-	-	4.6 UJ	5	0	0.00%	110	2	1.82%	1.4	0.8
Calcium	µg/L	-	-	250000	275000	275000	19	17.27%	110	110	100.00%	815000	5900
Chromium	µg/L	100	-	-	1180	1180	0	0.00%	110	51	46.36%	506	2.2
Cobalt	µg/L	-	-	-	50 U	-	-	-	110	39	35.45%	96.2	1.7
Copper	µg/L	1300	1000	-	50.6	1300	0	0.00%	110	22	20.00%	570	5.5
Iron	µg/L	-	300	1000	7720	7720	18	16.36%	110	94	85.45%	177000	96.4
Lead	µg/L	15	-	-	3.0 U	15	4	3.64%	110	11	10.00%	280	2.8
Magnesium	µg/L	-	-	-	26700	-	-	-	110	110	100.00%	70000	1180
Manganese	µg/L	-	50	-	712	712	15	13.64%	110	102	92.73%	2810	0.64
Mercury	µg/L	2	-	-	0.2 U	2	0	0.00%	110	5	4.55%	1.4	0.18
Nickel	µg/L	-	-	-	146	-	-	-	110	47	42.73%	564	3.3
Potassium	µg/L	-	-	-	2830	-	-	-	110	102	92.73%	34400	550
Selenium	µg/L	50	-	-	6.0 UJ	50	0	0.00%	110	4	3.64%	5.9	4.5
Sodium	µg/L	-	-	150000	106000	150000	11	10.00%	110	110	100.00%	353000	1320
Thallium	µg/L	2	-	-	12.35	12.35	0	0.00%	110	14	12.73%	2.7	0.14
Vanadium	µg/L	-	-	-	50 U	-	0	2.73%	110	46	41.82%	548	0.65
Zinc	µg/L	-	5000	-	34.1 U	5000	0	0.00%	110	29	26.36%	1370	5.5
General Chemistry													
Bromide	mg/L	-	-	-	0.5 U	-	-	-	110	33	30.00%	3.9	0.1
Chloride	mg/L	-	250	-	258	258	8	7.27%	110	110	100.00%	689	0.6
Cyanide (total)	mg/L	0.2	-	-	0.01 U	0.2	0	0.00%	97	8	8.25%	0.04	0.0052
Sulfate	mg/L	-	250	-	965	965	3	2.73%	110	110	100.00%	1160	6.4

Notes:

J	Estimated.
-	Not applicable.
MCL	Maximum Contaminant Level.
RDA	Recommended Daily Allowance.
BV	Background Value.
GWRAO	Groundwater Remedial Action Objective.

TABLE 5.4

INTERMEDIATE AQUIFER SUMMARY OF DETECTED METALS AND GENERAL CHEMISTRY PARAMETERS
INTERIM GROUNDWATER MONITORING PROGRAM
HIMCO SITE
ELKHART, INDIANA

Parameters	Units	Primary MCL	Secondary MCL	RDA	BV	GW RAO	Number of Exceedences (compared to GW RAO)	Percentage of Exceedences (compared to GW RAO)	Number of Samples	Number of Detections	Percentage of Detections	Maximum Detection	Minimum Detection
Metals													
Aluminum	µg/L	-	50	-	161	161	4	4.12%	97	18	18.56%	627	19.7
Antimony	µg/L	6	-	-	37 U	37 U	0	0.00%	97	12	12.37%	0.62	0.14
Arsenic	µg/L	10	-	-	7.9	10	4	4.12%	97	91	93.81%	20.4	0.42
Barium	µg/L	2000	-	-	133	2000	0	0.00%	97	97	100.00%	186	15.7
Beryllium	µg/L	4	-	-	2.7 U	4	0	0.00%	97	9	9.28%	0.68	0.47
Calcium	µg/L	-	-	250000	86000	250000	0	0.00%	97	97	100.00%	232000	7070
Chromium	µg/L	100	-	-	89	100	0	0.00%	97	20	20.62%	20.2	2.3
Copper	µg/L	1300	1000	-	25 U	1300	0	0.00%	97	5	5.15%	7.9	5.8
Iron	µg/L	-	300	1000	1870	1870	47	48.45%	97	97	100.00%	8670	124
Lead	µg/L	15	-	-	3.0 U	15	0	0.00%	97	2	2.06%	2.6	2
Magnesium	µg/L	-	-	-	25300	-	-	-	97	97	100.00%	66400	13300
Manganese	µg/L	-	50	-	173	173	13	13.40%	97	97	100.00%	513	1
Mercury	µg/L	2	-	-	0.20 U	2	0	0.00%	97	2	2.06%	0.19	0.13
Nickel	µg/L	-	-	-	40 U	-	-	-	97	11	11.34%	8.6	3.2
Potassium	µg/L	-	-	-	7790	-	-	-	97	97	100.00%	95900	916
Selenium	µg/L	50	-	-	5.0 U	50	0	0.00%	97	2	2.06%	4.5	4.4
Sodium	µg/L	-	-	150000	31100	150000	0	0.00%	97	97	100.00%	65100	4260
Thallium	µg/L	2	-	-	9.85	9.85	0	0.00%	97	16	16.49%	0.56	0.15
Zinc	µg/L	-	5000	-	34.1 U	5000	0	0.00%	97	9	9.28%	10.5	5.5
General Chemistry													
Bromide	mg/L	-	-	-	0.5 U	-	-	-	97	24	24.74%	0.4	0.1
Chloride	mg/L	-	250	-	55	250	0	0.00%	97	96	98.97%	94.9	1.2
Cyanide (total)	mg/L	0.2	-	-	0.01 U	0.2	0	0.00%	86	12	13.95%	0.097	0.007
Sulfate	mg/L	-	250	-	430	430	0	0.00%	97	96	98.97%	271	7.8

Notes

- J Estimated.
- Not applicable.
- MCL Maximum Contaminant Level.
- RDA Recommended Daily Allowance.
- BV Background Value.
- GW RAO Groundwater Remedial Action Objective.

TABLE 5.5

**LOWER AQUIFER SUMMARY OF DETECTED METALS AND GENERAL CHEMISTRY PARAMETERS
INTERIM GROUNDWATER MONITORING PROGRAM**

**HIMCO SITE
ELKHART, INDIANA**

<i>Parameters</i>	<i>Units</i>	<i>Primary MCL</i>	<i>Secondary MCL</i>	<i>RDA</i>	<i>BV</i>	<i>GW RAO</i>	<i>Number of Exceedences (compared to GW RAO)</i>	<i>Percentage of Exceedences (compared to GW RAO)</i>	<i>Number of Samples</i>	<i>Number of Detections</i>	<i>Percentage of Detections</i>	<i>Maximum Detection</i>	<i>Minimum Detection</i>
Metals													
Aluminum	µg/L	-	50	-	3420	3420	0	0.00%	40	16	0.4	2010	20.3
Antimony	µg/L	6	-	-	1.89	6	0	0.00%	40	5	12.50%	0.48	0.15
Arsenic	µg/L	10	-	-	5.17	10	0	0.00%	40	31	77.50%	8.9	0.47
Barium	µg/L	2000	-	-	346	2000	0	0.00%	40	40	100.00%	224	35.2
Beryllium	µg/L	4	-	-	4.5 BJ	4.5 BJ	0	0.00%	40	3	7.50%	0.57	0.49
Calcium	µg/L	-	-	250000	122000	250000	0	0.00%	40	40	100.00%	133000	43800
Chromium	µg/L	100	-	-	33.6	100	0	0.00%	40	17	42.50%	24.6	2.3
Cobalt	µg/L	-	-	-	50 U	-	0	0.00%	40	1	2.50%	1.7	1.7
Copper	µg/L	1300	1000	-	25 U	1000	0	0.00%	40	3	7.50%	7.2	6
Iron	µg/L	-	300	1000	4930	4930	1	2.50%	40	39	97.50%	6530	110
Lead	µg/L	15	-	-	3.0 U	15	0	0.00%	40	4	10.00%	3.6	1.9
Magnesium	µg/L	-	-	-	60100	-	-	-	40	40	100.00%	45800	17800
Manganese	µg/L	-	50	-	570	570	0	0.00%	40	39	97.50%	379	9.5
Mercury	µg/L	2	-	-	0.2 U	2	0	0.00%	40	2	5.00%	0.19	0.16
Nickel	µg/L	-	-	-	28	-	-	-	40	16	40.00%	26.2	3.6
Potassium	µg/L	-	-	-	3260	-	-	-	40	37	92.50%	6830	632
Selenium	µg/L	50	-	-	5.0 U	50	0	0.00%	40	1	2.50%	4.8	4.8
Silver	µg/L	-	-	-	10.0 U	-	0	0.00%	40	1	2.50%	2.4	2.4
Sodium	µg/L	-	-	150000	70800	150000	0	0.00%	40	40	100.00%	61600	3390
Thallium	µg/L	2	-	-	1.0 U	2	0	0.00%	40	7	17.50%	0.23	0.16
Vanadium	µg/L	-	-	-	59	-	-	-	40	7	17.50%	4.5	1
Zinc	µg/L	-	5000	-	40	5000	0	0.00%	40	10	25.00%	55.7	8.1
General Chemistry													
Bromide	mg/L	-	-	-	0.5 U	-	-	-	40	21	52.50%	4.6	0.097
Chloride	mg/L	-	250	-	71.8	250	0	0.00%	40	40	100.00%	68.5	2.5
Cyanide (total)	mg/L	0.2	-	-	0.01 U	0.2	0	0.00%	35	5	14.29%	0.088	0.0052
Sulfate	mg/L	-	250	-	68.7	250	0	0.00%	39	33	84.62%	188	0.26

Notes

J	Estimated
-	Not applicable
MCL	Maximum Contaminant Level
RDA	Recommended Daily Allowance
BV	Background Value
GW RAO	Groundwater Remedial Action Objective

TABLE 6.2

**GROUNDWATER MONITORING PROGRAM WELLS
HIMCO SITE
ELKHART, INDIANA**

UPPER AQUIFER WELLS*Detection Monitoring Wells*

Well	Rationale
WT101A	iron and manganese routinely exceed GW RAOs and calcium often exceeds GW RAO
WT115A	benzene routinely exceeds GW RAO; arsenic, lead, iron and calcium occasionally exceeds GW RAO
WT116A	calcium routinely exceeds GW RAO and sodium and sulfate routinely exceed GW RAO

Compliance Monitoring Wells

Well	Rationale
WT106A	down gradient of iron and calcium at WT101A
WT111A	cross gradient of iron and calcium at WT101A
WT114A	cross gradient of iron and calcium at WT101A
WT115B	vertical delineation of benzene at WT115A
WT119B	down gradient of calcium at WT116A
WT120C	cross gradient of iron and calcium at WT101A
WT121A	down gradient of iron and calcium at WT101A
WT122A	down gradient of benzene at WT115A

Background Monitoring Well

WT102A

INTERMEDIATE AQUIFER WELLS*Detection Monitoring Wells*

Well	Rationale
WT106B	arsenic routinely exceeds the GW RAO
WT114C	arsenic occasionally exceeds the GW RAO
WT120B	arsenic occasionally exceeds the GW RAO

Compliance Monitoring Wells

Well	Rationale
WT101D	vertical delineation of iron and calcium at WT101A
WT101E	vertical delineation of iron and calcium at WT101A
WT114B	vertical delineation of arsenic at WT114C
WT120A	vertical delineation of arsenic at WT120B
WT121B	downgradient of arsenic at WT120B

Background Monitoring Well

WT102B

LOWER AQUIFER WELLS*Compliance Monitoring Wells*

WT101C
WTE3

TABLE 6.3

GROUNDWATER MONITORING PROGRAM PARAMETER LIST
HIMCO SITE
ELKHART, INDIANA

Volatile Organic Compounds

Benzene

Vinyl chloride

Metals

Aluminium

Arsenic

Barium

Beryllium

Calcium

Iron

Lead

Manganese

Mercury

Sodium

General Chemistry

Sulfate

Chloride